

CHANGES IN GENDER EARNINGS DIFFERENTIALS IN BULGARIA'S TRANSITION TO A MIXED-MARKET ECONOMY

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Early theorists predicted that women would bear the brunt of the transition from central planning to mixed market economies in East Central Europe (ECE) and the former Soviet States [Fong and Paull, 1993; Sziraczki and Windell, 1992; Einhorn, 1993]. It was expected that liberalizing the centrally determined wages would increase inequality between men and women. Dismantling the system of extensive social benefits established to promote equality and encourage female labor force participation coupled with the privatization of childcare would increase the costs of participating in the labor market. Furthermore, labor shedding was expected to hit industries with a high concentration of female workers first and hardest, leading to high unemployment rates among women.

Evidence from the early transition, however, suggests that women in some transitioning economies have actually improved their economic position relative to men despite rising overall earnings inequality throughout the region [Rutkowski, 1996]. In 1986 the average female worker in Bulgaria earned about 74 percent as much per month as the average male worker. By 1993, the monthly earnings differential between men and women decreased by almost six percent.

The goal of this essay is to account for the decline in the gender earnings gap in Bulgaria's early transition within the broader context of the wage structure changes documented in transitioning economies. In particular, the analysis distinguishes between the portion of the decreased gender earnings gap caused by "group-specific" factors from the component caused by changes in the structure of wages, where "group-specific" factors represent the degree to which differences in skills between men and women or group differences in industry participation contribute to the decline in the earnings gap. "Wage-structure" factors describe the institutional context in which wages are determined and consist of the portion of the gap explained by changes in skill prices (such as returns to education or returns to working in a particular industry) and changes in the overall level of inequality in an economy.

The empirical research relies on cross-sectional survey data from 1986 and 1993. This allows for a comparison between pre- and early-transition Bulgaria, because the initial measures of the economic reform were implemented in 1991 when prices and wages were liberalized. The 1986 survey is the only existing pre-transition survey from Bulgaria and enables an analysis of the heretofore unexplored Bulgarian wage structure prior to 1989. The change in the earnings differentials between 1986 and

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1993 is then decomposed using the Juhn, Murphy, and Pierce [1991] technique to identify the degree to which each factor contributed to women's wage gains.

Bulgarian women's gains in the early transition are related to both changes in the relative returns to skill and changes in the composition of demand for goods and services as the country moved toward a market economy. Women began the transition with as many years of education as men, but were more likely than men to have obtained more general secondary and university degrees—degrees that, in contrast to technical or vocational degrees, are experiencing increased remuneration in the transition. Because more women have had an asset that has become more valuable, they have improved their relative position. Furthermore, labor demand increased the most in industries with more female workers while it fell among those industries dominated by male workers. Although men began to enter commerce and services, women continued to dominate these growing areas in the early transition, which increased their relative earnings.

INSTITUTIONAL BACKGROUND

During the year following the fall of President Todor Zhivkov¹ in November 1989, which marked the formal end of central planning, Bulgaria's budget deficit grew, the money supply remained unconstrained, and average nominal wages grew by 173 percent [Enev and Koford, 1997, 86]. In early 1991 a package of fiscal and monetary policies was introduced in the Polish-style "big bang shock therapy" to open and stabilize the economy [World Bank, 1996, 23]. In February of that year, wages were decentralized and the prices of 90 percent of goods were liberalized.² These liberalization and stabilization programs were introduced under extremely unfavorable conditions. The Bulgarian economy depended heavily on Council of Mutual Economic Assistance (CMEA) markets and was, consequently, heavily penalized by their collapse. (In 1991, GDP declined by 16 percent.) Not only were trade relations with the Commonwealth of Independent States (CIS) halted, the UN embargo against the former Yugoslavia limited Bulgaria's access to Western European markets. The Gulf crisis worsened the situation as Iraq's debt was Bulgaria's biggest outstanding foreign loan [Beleva, et al., 1994, 31].

An ideology of equality coupled with a system of centralized wage setting limited the level of earnings inequality during central planning. To limit any negative social consequences of wage and price liberalization, several new institutions developed in the early transition to limit increases in earnings inequality. These included a tax-based incomes policy, a minimum wage, and collective bargaining at the national, regional, and enterprise levels.

A tax-based incomes policy was introduced after price liberalization in 1991 on behalf of a tripartite agreement among government, employers and the largest national trade union federation.³ Beginning in the second quarter of 1991, direct controls on wages were applied [Tzanov and Vaughan-Whitehead, 1997, 100]. Based on actual and expected inflation, the controls imposed a ceiling on the nominal wage bill of individual enterprises to limit wage growth. The government planned to enforce the policy by levying a highly progressive tax against excessive wage increases.⁴ In reality, enterprises avoided paying the tax [Enev and Koford, 1997].

In addition to the incomes policy, public employee wages were controlled through the maintenance of a universal minimum wage for all full-time workers. Under trade union pressure, the state increased the minimum wage in 1990 from 180 to 191 *Leva* per month. In 1992, the minimum wage increased to 850 *Leva* per month (equivalent to \$30). Although it was adjusted irregularly, the real value of the minimum wage did not keep up with inflation [Tzanov and Vaughan-Whitehead, 1997, 100-101]. The real value of the minimum wage based on 1989 *Leva* fell from 180 in 1989 to 71.3 *Leva* per month in 1993.

Collective bargaining over wages was forbidden in Bulgaria during the first years of the Communist period (from the 1940s to 1951) while non-wage issues were negotiable. During the early transition (between 1989 and 1993) a pluralist system of industrial relations developed within the context of continuous political upheaval.⁵ Trade unions and employers began to distance themselves from the State and the Communist Party [Thirkell and Tseneva, 1992] and union activities were no longer subordinated to the economic goals of the state [Iankova, 2000]. By 1993 four levels of negotiation were present in Bulgaria [Iankova, 2000]. These included national tripartite negotiations between the government, the national trade union organizations, and the national organizations of employers, industry and sector level negotiations, regional/local negotiations, and bargaining at the enterprise level including representatives of the state, union, and employer organizations. By July of 1991, 37 percent of state enterprises had negotiated collective bargaining agreements, and by November of that year about 74 percent of the wage-earners were covered by collective agreements.

METHODOLOGY

The methodology used in this analysis to decompose the change in the gender earnings differentials over time is based on the decomposition developed by Juhn, Murphy, and Pierce [1991] in their analysis of black-white wage convergence in the United States. The Juhn et al. methodology begins by estimating a male earnings equation for male worker i in time t

$$(1) \quad Y_{it} = X_{it}\beta_t + \sigma_t\theta_{it} + u_{it}$$

where X_{it} is a vector containing the observable characteristics of an individual male worker and β_t gives the coefficients on these characteristics in year t ; it is assumed that $E(u_{it}|x_{it}) = 0$, so that this equation gives mean earnings for males with given characteristics. σ_t is the standard deviation of the residual of the male earnings function in year t , and $\theta_{it} = u_{it} / \sigma_{mt}$ is a "standardized" residual of the male regression (with mean zero and variance one).⁶ Changes in σ_t through time reflect changes in within-group inequality.

The actual earnings differential between males and females is:

$$\Delta Y_t = Y_{mt} - Y_{ft} = (X_{mt}\beta_{mt} + \sigma_{mt}\theta_{mt}) - (X_{ft}\beta_{ft} + \sigma_{ft}\theta_{ft}).$$

Because female earnings regressions are based on male regression coefficients (and male earnings residuals), it can be assumed that $b_{mt} = b_{ft}$, such that the earnings differential can then be written as:

$$(2) \quad \begin{aligned} \Delta Y_t = Y_{mt} - Y_{ft} &= (X_{mt} - X_{ft})\beta_{mt} + \sigma_{mt}(\theta_{mt} - \theta_{ft}) \\ &= \Delta X_t \beta_{mt} + \sigma_{mt} \Delta \theta_t, \end{aligned}$$

where $\Delta X_t = (X_{mt} - X_{ft})$ is the wage difference between men and women for the average of the individual observable characteristics, the term $\Delta X_t \beta_{mt}$ is the predicted wage gap between females and males in time t . $\Delta \theta_t = (\theta_{mt} - \theta_{ft})$ is the difference in the average standardized wage residual for males and females in time t . $\theta_{ft} = (Y_{ft} - X_{ft}\beta_{mt})/\sigma_{mt}$ where $(Y_{ft} - X_{ft}\beta_{mt})$ is the difference between a woman's actual earnings and the earnings that she would have received had she been rewarded for her characteristics at the same rate as men. If there were no difference in returns between men and women ($\beta_{mt} = \beta_{ft}$), the difference would have a mean of zero.

Typically, this value is negative, implying that on average women with the same characteristics as men earn less. This difference is then divided by the standard deviation of the residual of the male earnings function in time t , σ_{mt} . This standardization yields the number of male residual standard deviations below zero that the average woman is paid. The term $\sigma_{mt} \Delta \theta_t$ then can be interpreted as women's relative position in the male residual earnings distribution at a given level of residual male earnings inequality in time t .

Using this formulation, earnings convergence between males and females between one year, such as year t , and another year, such as year s , can be written as:

$$(3) \quad \Delta Y_s - \Delta Y_t = (\Delta X_s - \Delta X_t) \beta_{mt} + \Delta X_s (\beta_{ms} - \beta_{mt}) + (\Delta \theta_s - \Delta \theta_t) \sigma_{mt} + \Delta \theta_s (\sigma_{ms} - \sigma_{mt})$$

This decomposes the earnings convergence into four components of observable and unobservable characteristics. The first term in equation (3) is the portion of the change in the earnings gap due to differences in measured characteristics such as years of schooling and experience, or industry, evaluated at fixed male prices, $(\Delta X_s - \Delta X_t) \beta_{mt}$. Blau and Kahn [1999] refer to this term as the "Measured Characteristics Effect." The second term measures the amount of the change in the earnings differential over time that is attributable to changes in the prices paid to men for those measured characteristics, or the male returns to education, experience, and industry, $\Delta X_s (\beta_{ms} - \beta_{mt})$. Blau and Kahn [ibid.] refer to this term as the "Measured Prices Effect." The third term denotes changes in women's relative position in the male residual earnings distribution—that is, whether females are moving up or down in the distribution of male earnings residuals over time, $(\Delta \theta_s - \Delta \theta_t) \sigma_{mt}$. Blau and Kahn [ibid.] refer to this term as the "Gap Effect." The last term reflects differences in residual inequality over time, or the difference in the "penalty" placed on being at a lower position in the earnings distribution, $\Delta \theta_s (\sigma_{ms} - \sigma_{mt})$. Blau and Kahn [ibid.] refer to this term as the "Unmeasured Price Effect." Provided that the $\Delta \theta_t$ term is negative (that women earn less than men on average), the fourth term indicates that an in-

crease in inequality would increase the male-female earnings differential even if women maintained the same relative position in the male distribution, $\Delta\theta_s - \Delta\theta_t = 0$.⁷

The sum of the first and third terms is a reflection of the gender-specific factors that contribute to the difference in earnings. Gender differences in qualifications and gender differences in earnings rank at a given level of measured characteristics. The sum of the second and fourth terms is a reflection of the labor market structure. The wage-structure effect measures the impact of cross-time differences in returns to measured and unmeasured characteristics. The sum of the third and fourth terms represents the impact of cross-time differences in the “unexplained” differential in traditional decompositions.⁸

DATA AND DESCRIPTIVE INFORMATION

This analysis is based on two cross-sectional household surveys conducted in Bulgaria, one administered prior to the transition and the other after the initial economic reforms were in place. The 1986 *Town and Village Survey*, conducted by the Institute of Sociology of the Bulgarian Academy of Sciences in Sofia, was carried out in conjunction with the national census delivered in the winter of 1985 and contains heretofore unexplored information on the structure of Bulgarian wages prior to the transition. The sample is random and representative of the population. After eliminating those who reported zero earnings,⁹ the sample of employed civilians contains 6,545 cases.

The second survey, Social Stratification in Eastern Europe after 1989: General Population Survey (SSEE),¹⁰ was conducted in 1993 by a team of investigators from University of California-Los Angeles (UCLA) in conjunction with Bulgarian officials from the Central Statistical office. The field research took place between June and July of 1993, during which time 4,921 interviews were completed. The empirical analysis is restricted to employed civilians of working age and contains 2,828 cases. Those working in agriculture and self-employed individuals are included in this analysis. Monthly earnings were not adjusted for hours spent in the labor market in either the 1986 or the 1993 analysis.^{11, 12} A Heckman [1976; 1980] test for selection bias problem found no bias in the sample.

Changes in the gender earnings differentials during the early years of Bulgaria's transformation from a planned economy to a mixed-market economy are reported in Table 1. According to the table, the log gender earnings gap decreased over that time period from 0.2921 to 0.2053, or a decrease of 0.0867 log points. This evidence indicates that the log gender earnings differential decreased by over 29 percent over the period.

The pattern of changes in gender earnings differentials across transitioning countries reported in the literature is inconsistent, as are the explanations for the changes. Several authors report a decline in female wages relative to male wages in early-transition Russia between 1991 and 1993 [Brainerd, 1998; Glinskaya and Mroz, 2000; Newell and Reilly, 1998]. Also examining early-transition Russia, Ogloblin [1999] attributed the gender wage gap to occupational segregation. Hunt [1998] found a decline in the gender wage gap in unified Germany between 1990 and 1994. She

TABLE 1
Changes in Log Gender Earnings Differentials
Bulgaria 1986 and 1993^a

	Log of Male Earnings	Log of Female Earnings	Gender Gap
1986	5.4327	5.1407	0.2921
1993	7.7198	7.5145	0.2053
Gap ₉₃ – Gap ₈₆			-0.0867

a. Data is from a sample of the employed. Log wages are reported in nominal terms and reflect the massive realignment of prices in the transition.

Source: Author's calculations.

attributed this to a fall in female employment rather than an improvement in women's economic well-being. Orazem and Vodopivec [2000] found that relative wages for women rose in both Estonia and Slovenia. The authors attributed women's relative improvement to increased returns to human capital and shifts in industrial demand that favored female-dominated industries.

Explaining the Fall in the Gender Earnings Gap

“Group-Specific” Factors. Economists traditionally approach the question of wage differentials between men and women by focusing on the role of differences in qualifications between gender groups, occupational or industrial segregation, or on differences in the treatment of similarly qualified individuals (discrimination). Differences in human capital accumulation or occupation between groups can be referred to as *group-specific* factors—where groups are based on gender, race, or ethnicity—that influence wage differentials [Blau and Kahn, 1999].¹³ The following discussion explores changes in such group-specific factors over time to explain the fall in the gender earnings gap.

Table 2 presents changes in education and labor market experience among men and women between 1986 and 1993. The information in this table indicates that the men and women obtained nearly the same number of years of schooling in 1986 with women obtaining slightly more on average by 1993 (11.24 years versus 10.96 years). Women also began to close the gap in labor market experience in the early transition (from a difference of 12 percent in 1986 to 4 percent in 1993). This evidence points to a decline in the gender earnings gap, indicating that group-specific effects play a strong role in the decline in the gender earnings differential.

Educational differences between men and women become more striking after breaking the variable down into categories representing degrees completed by individuals. In both years men were much more likely than women to receive primary, technical, and vocational degrees. Women, in contrast, were more likely in both years to obtain a general secondary or university-level education. Nearly 14 percent of women versus nearly 12 percent of men obtained a university degree in 1986, suggesting that real differences existed between men and women in terms of the kind of degrees they

TABLE 2
Pre- and Early-Transition Educational Distribution of
Males and Females in the Labor Market
Bulgaria 1986 and 1993

	All	Males			Females		
	% Change	1986	1993	%Change	1986	1993	%Change
Years of Schooling	0.092	10.12	10.96	0.083	10.20	11.24	0.102
Incomplete Primary	0.199	0.06	0.08	0.333	0.07	0.08	0.143
Complete Primary	-0.384	0.35	0.23	-0.343	0.31	0.17	-0.452
Secondary Technical	0.294	0.23	0.31	0.348	0.22	0.27	0.227
Secondary Vocational	-0.626	0.17	0.06	-0.647	0.10	0.04	-0.600
Secondary General	1.376	0.07	0.21	2.00	0.14	0.30	1.1429
University	-0.042	0.12	0.12	0.00	0.14	0.14	0.00
Experience	0.283	17.37	21.49	0.237	15.47	20.66	0.335
N	3,220	1,396	3,245	1,432			

Columns may not sum to 1.0 due to rounding. Results are based on a sample of the employed.

Source: Author's calculations

have completed. Literature from other ECE countries documents similar differences between men and women in the kind of degrees they obtained during communism. In Poland, for example, female students from all economic backgrounds and from both rural and urban areas avoided technical fields and specialized vocational studies, opting for post-secondary programs such as teaching, nursing, and university education leading to what some have termed the “feminization of higher education” [Bialecki and Heyns, 1993, 116]. Studies from Poland [Bialecki and Heyns, 1993], Estonia and Slovenia [Orazem and Vodopivec, 2000] find that differences in the educational degrees obtained by men and women benefited women in the transition.

In addition to education and experience, systematic differences between men and women in industry participation may explain some of the narrowing of the gender earnings gap. Table 3 presents the distribution of men and women in the labor market as well as the change in employment in each industry. This table indicates that employment grew most rapidly in the commerce and service industries. In contrast, overall employment declined in manufacturing, construction, agriculture, public administration, and communications in the early transition. In absolute terms women continued to be more likely than men to be employed in the growth industries in both 1986 and 1993. Bialecki and Heyns [1993, 116] argue that women’s over-representation in white-collar industries during communism and in the early transition was a direct consequence of the educational policies that promoted vocational and technical education and, ultimately, working-class males. In terms of employment trends, men entered the growth industries at a faster rate than women indicating that men may overtake women in the growth industries.

“Wage-Structure” Factors. In addition to group-specific factors, labor market institutions associated with the overall wage structure in an economy can play an important role in generating wage differentials [Blau and Kahn, 1999]. “Wage-structure” factors refer to how different characteristics (such as schooling, experience, or

TABLE 3
Pre- and Early-Transition Industry Distribution of
Males and Females in the Labor Market
Bulgaria 1986 and 1993^a

	% Female			All			Males			Females		
	1986	1993	Change	1986	1993	Change	1986	1993	Change	1986	1993	Change
Manufacturing	51.13	50.00	-0.1578	0.3419	0.2973	-0.1306	0.3550	0.2898	-0.1837			
Construction	21.47	23.91	-0.1398	0.1193	0.1003	-0.1591	0.0324	0.0307	-0.0504			
Agriculture	44.77	46.93	-0.0684	0.1919	0.1734	-0.0968	0.1544	0.1494	-0.0321			
Commerce	66.52	55.16	0.8289	0.0478	0.1182	1.4714	0.0943	0.1418	0.5033			
Services	67.65	56.50	0.4074	0.0578	0.1103	0.9098	0.1199	0.1397	0.1651			
Public Administration	44.67	60.78	-0.4082	0.0677	0.0287	-0.5768	0.0542	0.0433	-0.2017			
Transportation	23.34	33.91	0.2919	0.0969	0.1089	0.1237	0.0293	0.0545	0.8606			
Communications	69.73	71.05	-0.0609	0.0696	0.0630	-0.0938	0.1590	0.1508	-0.0514			
N				3,220	1,396		3,245	1,432				

a. Columns may not sum to 1.0 due to rounding; the industry groups refer to 1-digit industry codes; data is from a sample of the employed. Source: author's calculations

industry) are *rewarded* in an economy as well as changes in the overall level of inequality in an economy. Table 4 presents the results of an extended log earnings function that controls for demographic factors such as marital status and living in the capital city, Sofia, as well as sector (private, state or cooperative) and one-digit industry codes of employment. Industry or occupational dummies could be endogenous and could be correlated with the error terms of earnings equations. Regressions both with and without industry controls are estimated in this paper and the results of the decomposition are similar.

The results presented in Table 4 indicate that, as expected, the returns to general secondary education and university education increased for both men and women in the early transition. In contrast, returns to vocational degrees became negative for both men and women by 1993, and returns to technical degrees fell for women. The returns to a technical degree increased, but to a much smaller extent, for men. In absolute terms, the returns to university education were much higher among women at nearly 43 percent in 1993 compared to men at 36 percent. This indicates that women with university degrees gained more than men at the same educational level. The trends in returns to higher degrees, however, favor men. The returns to general secondary education for men increased by nearly 10 percent while the returns to university education increased by nearly 12 percent. Among women, general secondary returns increased by only 8.4 percent and university returns increased by 7 percent.

Changes in the returns to working in particular industries were also similar for men and women. Both gender groups experienced the largest increases in returns in the commerce and service industries. Men's returns to commerce increased by over 25 percent compared to 11 percent for women. In services, men's returns increased by nearly 10 percent as compared to women's 14 percent.

Changes in the overall level of inequality in an economy can also affect earnings differentials between men and women. An absolute increase in inequality can penal-

TABLE 4
Log Earnings Functions
Bulgaria 1986 and 1993

	Male			Female			Male-Female
	1986	1993	Change ($B_{93} - B_{86}$)	1986	1993	Change ($B_{93} - B_{86}$)	Difference 1993
<i>constant</i>	5.1650	7.4265		4.8474	7.2489		
<i>priminc</i>	-0.1562 (-5.39)	-0.0665 (-1.59)	0.0897	-0.0679 (-2.75)	-0.0464 (-1.15)	0.0215	-0.0201
<i>techcomp</i>	0.0739 (5.20)	0.0815 (2.37)	0.0076	0.1306 (9.80)	0.1083 (3.34)	-0.0223	-0.0268
<i>vocomp</i>	0.0435 (2.67)	-0.0271 (-0.55)	-0.0707	0.0817 (4.48)	-0.0020 (-0.04)	-0.0837	-0.0252
<i>gencomp</i>	0.0404 (1.96)	0.1394 (3.69)	0.0990	0.0490 (3.01)	0.1327 (4.31)	0.0837	0.0067
<i>unicomp</i>	0.2391 (12.69)	0.3569 (7.75)	0.1178	0.3561 (21.27)	0.4265 (10.93)	0.0704	-0.0696
<i>ex</i>	0.0230 (11.95)	0.0107 (2.95)	-0.0124	0.0271 (12.85)	0.0120 (4.42)	-0.0152	-0.0013
<i>exsq</i>	-0.0004 (-8.81)	-0.0002 (-3.03)	0.0002	-0.0005 (-9.00)	-0.0002 (-4.26)	0.0003	0.0000
<i>nonbulg</i>	-0.0394 (-2.29)	-0.0629 (-2.13)	-0.0235	-0.0368 (-2.16)	-0.0303 (-0.87)	0.0065	-0.0326
<i>married</i>	0.0573 (3.78)	0.0354 (1.09)	-0.0218	-0.0310 (-2.17)	-0.0180 (-0.71)	0.0130	0.0535
<i>sofia</i>	0.0712 (4.21)	0.1515 (4.29)	0.0804	0.0295 (1.95)	0.1138 (4.26)	0.0843	0.0377
<i>state</i>	0.0324 (1.60)	0.0994 (2.46)	0.0670	0.0570 (2.90)	0.0286 (0.80)	-0.0284	0.0708
<i>private</i>	0.0253 (0.14)	0.2818 (5.57)	0.2565	0.2262 (0.89)	0.1827 (3.41)	-0.0435	0.0991
<i>const</i>	-0.0301 (-1.85)	-0.0524 (-1.17)	-0.0223	-0.0159 (-0.70)	0.0056 (0.09)	0.0215	-0.0580
<i>ag</i>	-0.1462 (-7.33)	-0.1051 (-2.71)	0.0411	-0.0519 (-2.44)	-0.0344 (-0.97)	0.0175	-0.0707
<i>comrce</i>	-0.2482 (-10.61)	0.0031 (0.06)	0.2513	-0.1441 (-8.64)	-0.0355 (-0.98)	0.1086	0.0386
<i>svcs</i>	-0.2030 (-9.90)	-0.1063 (-2.51)	0.0967	-0.1487 (-9.88)	-0.0056 (-0.17)	0.1431	-0.1007
<i>pubadmin</i>	0.0357 (1.56)	-0.0911 (-1.26)	-0.1268	-0.0306 (-1.48)	-0.0324 (-0.65)	-0.0018	-0.0587
<i>trans</i>	-0.0722 (-3.84)	-0.0468 (-1.17)	0.0254	-0.0597 (-2.17)	0.0484 (1.08)	0.1082	-0.0952
<i>Communi</i>	-0.2505 (-11.81)	-0.1905 (-4.11)	0.0599	-0.1442 (-9.79)	-0.0559 (-1.821)	0.0883	-0.1346
R ²	0.2247	0.1671			0.1808		
F-test	49.02	13.33			15.32		
N	3,220	1,396			1,432		

T-statistics are in parentheses; log of monthly earnings is dependent variable; primary education, cooperative employment and manufacturing are benchmarks. Results are based on a sample of the employed. Source: author's calculations

TABLE 5
Changes in the Wage Structure: Ratios of Top Decile Earnings to Bottom Decile Earnings by Gender, Education, and Industry

	Ratio of Top Decile to Bottom Decile		
	1986	1993	% change
All	3.296	5.341	0.620
Men	3.491	5.524	0.582
Women	3.090	4.958	0.605
Primary Incomplete	3.538	5.651	0.597
Primary Complete	3.223	4.207	0.305
Technical Complete	3.254	5.303	0.630
Vocational Complete	3.326	5.475	0.646
General Complete	3.150	5.463	0.734
University Complete	3.139	4.343	0.384
Manufacturing	3.092	5.326	0.723
Construction	3.662	5.363	0.464
Agriculture	3.246	4.955	0.526
Commerce	3.184	5.535	0.738
Services	3.445	6.053	0.757
Public Administration	2.871	6.028	1.100
Transportation	3.287	5.006	0.523
Communication	3.274	5.199	0.588

Data is from a sample of the employed. Source: author's calculations.

ize the low-end of the earnings distribution even if the relative level of inequality goes unchanged (or even improves). Congruent with evidence that inequality increased in Bulgaria's early transition [Rutkowski, 1996; Beleva, Jackman, and Nenova-Amar, 1995], Table 5 presents evidence of a widening distribution of wages in Bulgaria in the early transition. The ratio of average top-decile to bottom-decile earnings for both 1986 and 1993 are presented, as are percentage changes in the ratio by gender, education, and industry. Earnings differences between the very rich and the very poor in Bulgaria grew between 1986 and 1993.

In summary, both group-specific factors and wage-structure factors may have contributed to the decreased earnings gap between men and women in Bulgaria's early transition. In terms of group-specific factors, women obtained as much or more years of schooling as men and obtained higher degrees that were rewarded in the transition. Laporte and Ringold [1997] argue that those obtaining more generalized and higher education have greater flexibility in the uncertain transition and command higher wages. While applied vocational training and technical skills were essential to the development of heavy industry during central planning [Bialecki and Heyns, 1993], more generalized and higher-level education is better suited to the new market economy. Women were also over-represented in growing industries such as commerce and services, although men are moving into these industries at a faster rate.

Changing returns to education and industry also served to improve the relative economic position of women in the early transition. The returns to higher education

as well as the female-dominated commerce and service industries increased for both men and women. In contrast to these positive trends, increased inequality between the rich and the poor penalized those in the low end of the wage distribution, who were more likely to be women than men. To determine the degree to which each factor explains the decrease in the gender earnings gap, it is necessary to decompose the changes in the earnings gap. It is expected that the changing returns to the educational degree obtained and to employment in particular industries that favored women in the early transition will explain the bulk of the decrease in the gender earnings gap.

RESULTS

The earnings decomposition for the “Basic”, “Extended” and “Full” models are presented in Table 6. To explain these changes, the differential is broken down into four separate effects: the observed characteristics effect, the observed price effect, the gap effect, and the unmeasured prices effect. Group-specific factors consist of the “observed characteristics effect” plus the “gap effect.” Wage-structure factors consist of the “observed price effect” plus the “unmeasured prices effect.”

From the descriptive information provided in the previous sections, it is hypothesized that differences in the educational degree obtained as well as differences in the rate at which men and women entered growing industries in the early transition contributed to the decrease in the earnings gap between men and women. The portion of the gap explained by these factors is captured in two parts of the decomposition. The first is within the “observed characteristic effects.” These results show the effect of changes in the level of education obtained over time and employment in a particular industry. The second is within the “observed price effect,” which shows the effect of changes in the returns to different levels of education and to employment in different industries on the gender earnings gap.

Group-Specific And Wage-Structure Factors

Focusing on the “full model” in Table 6, three of the four components of the Juhn et al. decomposition are negative, contributing to a decline in the gender earnings gap.¹⁴ The “observed characteristics effect,” the “observed prices effect,” and the “gap effect” served to diminish earnings differences between men and women. A negative “observed characteristics effect” indicates that changes in the differences between men and women in observable characteristics such as the number of years of schooling or the industry in which men or women tend to participate served to diminish the gender earnings gap. In other words, additional years of schooling, for example, benefited women and improved their relative earnings. Similarly, a negative “observed prices effect” indicates that changes in returns to these characteristics benefited women over men, diminishing the gender earnings gap. A negative “gap effect” signifies women’s movement up the distribution of male earnings—an indication of their improvement in terms of relative earnings.

The last components “unobserved prices effect” served to increase the gender earnings gap. This factor is closely tied with changes in inequality in the wage structure.

TABLE 6
Analysis of Log Wages
Bulgaria 1986–1993

	Basic	Extended	Full
Observed Characteristics Effect (Xs)	–0.0132 (–8.96)	–0.0070 (–0.56)	–0.0139 (–0.49)
Years of Schooling	–0.0061 (–8.15)		
Primary Incomplete		–0.0014 (–4.67)	–0.0012 (–3.73)
Secondary Technical Complete		0.0042 (2.99)	0.0030 (2.15)
Secondary Vocational Complete		–0.0037 (–1.32)	–0.0024 (–0.89)
Secondary General Complete		–0.0012 (–1.86)	–0.0007 (–1.07)
University Complete		0.0015 (5.36)	0.0015 (5.19)
Experience	–0.0257 (–6.89)	–0.0253 (–6.52)	–0.0248 (–6.38)
Experience Squared	0.0186 (6.08)	0.0189 (6.18)	0.0186 (5.97)
Nonbulg			–0.0011 (–1.34)
Married			0.0040 (1.76)
Sofia			0.0004 (2.02)
State			–0.0025 (–0.80)
Private			0.0015 (0.50)
Construction			0.0005 (0.67)
Agriculture			0.0020 (3.78)
Commerce			–0.0057 (–5.07)
Services			–0.0067 (–4.80)
Public Administration			–0.0010 (–0.49)
Transportation			0.0010 (1.80)
Communication			–0.0004 (–5.40)
Observed Prices Effect	–0.0039 (–0.03)	–0.0164 (–0.13)	–0.0169 (–0.12)
Years of Schooling	–0.0025 (–4.10)		
Primary Incomplete		–0.0007 (–1.58)	–0.0007 (–1.69)
Secondary Technical Complete		0.0005 (8.30)	0.0003 (5.41)
Secondary Vocational Complete		–0.0021 (–1.03)	–0.0014 (–0.73)
Secondary General Complete		–0.0099 (–5.28)	–0.0092 (–4.91)
University Complete		–0.0031 (–4.84)	–0.0022 (–3.40)
Experience	–0.0126 (–0.89)	–0.0110 (–0.76)	–0.0102 (–0.71)
Experience Squared	0.0113 (0.11)	0.0098 (0.09)	0.0102 (0.10)
Nonbulg			–0.0009 (–3.73)
Married			–0.0007 (–0.74)
Sofia			–0.0019 (–2.78)
State			–0.0057 (–29.48)
Private			0.0167 (57.55)
Construction			–0.0016 (–0.71)
Agriculture			0.0010 (1.06)
Commerce			–0.0059 (–4.65)
Services			–0.0028 (–1.79)
Public Administration			0.0019 (4.36)
Transportation			0.0014 (0.83)
Communication			–0.0053 (–2.22)
Gap Effect	–0.1390 (–5.95)	–0.1340 (–5.81)	–0.1220 (–6.65)
Unobserved Price Effect	0.0693 (11.25)	0.0705 (11.46)	0.0660 (22.00)
Total Change in Gap (1993–1986)	–0.0867	–0.0867	–0.0867
Sum of Group–Specific Effects	–0.1520	–0.1410	–0.1360
Sum of Wage Structure Effects	0.0654	0.0541	0.0491
Sum of Unobserved Effects	–0.0696	–0.0633	–0.0559

The regression includes controls for education, experience and its square, living in the capital city, marital status, sector of the economy, and industry. T-statistics are in parentheses. The computation of the standard errors follows Gill and Leigh [2000] and Brown and Corcoran [1997]. Source: Author's calculations.

Changes in the overall level of inequality in the economy penalized those at the low end of the earnings distribution, and women tend to be at the low end of the earnings distribution. Changes in “group-specific factors” helped women whereas changes in “wage-structure factors” hurt women. On net, however, the group-specific factors outweighed the negative wage-structure effect, resulting in an improvement in women’s relative earnings. Further, none of the remaining difference between male and female earnings is explained by what is sometimes referred to as “discrimination” (the gap effect plus the unobserved prices effect).

Observed Characteristics. Looking first at the “observed characteristics” category, Table 6 illustrates that the impact of measured characteristics is negative for all three models, indicating that the women in 1993 have relatively favorable levels of schooling, experience, and industry of employment as compared to 1986. Women experienced a relative gain in observable characteristics contributing to a decline in the gender earnings gap over the period by 0.0132, 0.0070, and 0.0139 log points in each model respectively.

Disaggregating the “observed characteristics” effect into its component parts in the “full model” shows that the educational degree obtained and industry of employment contributed to the decline in the earnings gap, particularly for wage differences between men and women in vocational and general secondary education. These two factors constitute approximately 22 percent of the “observed characteristics effect” (0.0031/0.0139). Similarly, differences between men and women in industry employment also served to diminish the gender earnings differential. In particular, participation in commerce, services, public administration, and communication contributed to a decline in the gap.

Observed Prices. Like the “observed characteristics effect”, the “observed prices effect” served to decrease the gender earnings differential in each model by 0.0039, 0.0164, and 0.0169 log points respectively. This indicates that rising returns to schooling, sector of the economy, and industry, for example, favored women over men in the transition.

Focusing on the “full” model and breaking down the “observed prices” effect into its component parts, changing returns to all secondary and university-level degrees contributed to a decline in the gender earnings differential in the transition. The higher-education components consist of 0.0128 log points, translating into over 75 percent of the observed prices effect (0.0128/0.0169).

Changes in returns to the previously identified “growth” industries (commerce and services) also contribute to a fall in the gender earnings differential in Bulgaria’s early transition. These two industries alone comprise 0.0087 log points, translating into over 51 percent of the observed prices effect (0.0087/0.0169). This indicates that in the transition, rising returns to commerce and services favored women over men. One interpretation is that the large observed price effect (particularly in the “full model”) is due to the persistent high level of industry segregation by gender. The observed price effect may reflect discrimination if segregation by industry ‘crowds’ women into certain industries in the economy, thereby decreasing earnings [Bergmann, 1974]. In this case, industry segregation benefited women. As of 1993, women continued to be disproportionately represented in commerce and services and as a result, they benefited from the growth in these industries.

The Gap Effect. The “gap effect” measures the contributions of women’s placement each year in the male residual wage distribution to the change in the ethnic wage differential between 1986 and 1993. This effect decreased the gender pay gap by 0.1220 log points in the “full model.” This effect indicates that women moved up in the male residual earnings distribution.

Unmeasured Prices. The “unmeasured prices” effect served to exacerbate the gender earnings gap over time in all three models by 0.0693, 0.0705, and 0.0660 log points respectively. This factor indicates that the increase in overall inequality in the Bulgarian earnings distribution in the early transition hurt women and limited their gains made from improved characteristics and returns to those characteristics.

In summary, group-specific components (observed characteristics plus the gap effect) in the “full” model reduced the gender earnings gap by the largest amount, 0.1360 log points, while wage-structure factors (observed prices plus unobserved prices) increased the gap by 0.0491 log points. Assuming that price changes in the transition affected men and women similarly, rising inequality in the transition reclaimed some of the gains women made but the gains in terms of improved characteristics and prices in the transition were large enough to cause the gender earnings gap to decrease.

CONCLUSIONS

In the face of increased earnings inequality in the transition, women were able to “swim upstream” by improving their education and employment situation in terms of both observed characteristics and observed prices.¹⁵ By 1993, women obtained as many or more years of education than men. More importantly though, they tended to obtain more general secondary degrees and university degrees than men. With more of an asset that was better rewarded in the early transition, women improved their relative earnings. Similarly, although men were moving into commerce and services, by 1993 women continued to be disproportionately represented in these growing industries and enjoyed a relative growth in earnings. At the low end of the earnings distribution, women were penalized by the increase in overall economic inequality by 1993. On net, however, the gains they had made outweighed the losses from increased inequality.

Further research is needed in several dimensions to gain a better understanding of the effects of the transition on gender inequality. First, because this study covered only the early years of Bulgaria’s transition, one cannot extrapolate the effect of the transition to women’s relative economic position more generally. Studies on later years in the transition would shed light on the long-term effects. Second, a more detailed study on differences in education obtained by men and women would enhance these preliminary findings. Third, more detailed occupational data as well as information on skilled versus unskilled labor and managerial status would illuminate the degree to which women in Bulgaria (and ECE more generally) faced both horizontal and vertical segregation in industries and occupations and whether or not such segregation contributed to gender inequality in the transition.

NOTES

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1. President Todor Zhivkov was the longtime communist leader of Bulgaria.
2. The government continued to monitor prices of fourteen essential commodities, four goods were priced by the state, and a special policy was introduced to control energy prices [Pishev, 1992].
3. For a detailed description of the wage determination and wage policy in Bulgaria during the period 1990-1993, see ILO-CEET and EC [1994] and Bankov [1994].
4. The tax on excess wage fund increases between February and June of 1991 was determined by the following scheme: If the increase was < 1 percent above the fund, a 100 percent marginal tax rate was placed on the increment; if between 1 and 2 percent the marginal tax rate was 200 percent; if between 2 and 3 percent the tax was 400 percent; and if above 3 percent, the marginal tax rate was 800 percent.
5. Between November of 1989 and December of 1991 alone, the country saw four changes in government.
6. There will be a difference between the male and the female standardized residuals (θ_{mt} and θ_{ft}) because, though the female regression is based on male coefficients, it relies on female characteristics.
7. Although this decomposition breaks down the residual factors into two components, as opposed to the Blinder [1973] or Oaxaca [1973] techniques, the components still represent that portion of the difference in earnings that cannot be explained by the explanatory variables in the wage equation. In other words, regardless of the fact that the residual is decomposed, it is still a residual, and it is still a measure of our ignorance and dependant on the structure of the regression equation.
8. Like other decomposition techniques, the Juhn, Pierce and Murphy technique is subject to the familiar index problem. The year that one chooses as a base may alter the specific values obtained for each of the four components of the decomposition. For example, in this decomposition, I use 1986 as the base year and examine changes in the gender earnings differentials that occur by 1993 as opposed to using 1993 as the base year. Regardless of what base year is used, the overall results are robust. Similarly, whether or not one chooses to base the decomposition on a female earnings equation versus a male earnings equation will also affect the specific results. Following other studies, this formulation bases the decomposition on the male regression because it is expected that over time, discrimination against women will affect male regression coefficients to a lesser extent. These estimates form the basis for the estimate of the observed price effect and doing so will limit any distortions that could occur from discrimination (See also Blau and Kahn [1999]).
9. Twenty-two respondents reported zero earnings in the sample of the employed.
10. The Bulgarian survey is part of a larger multi-country comparative research project including five other Central and East European countries.
11. The number of hours worked was only available in the 1993 survey; however, it is a reasonable assumption that all employed individuals during Communism worked full-time. Normal working hours per week were generally longer in Central and Eastern than in Western European countries. In particular, the average workweek in Bulgaria during Communism was approximately 40.5 for both men and women [Kroupova, 1990, 10, quoted in Hubner, Maier, and Rudolph, 1991, 34]. Adjusting for hours in the 1993 analysis made no significant difference in the results. The results of the 1993 analysis after adjusting for hours as well as a description of how the data were adjusted to account for hours in the adjusted analysis are available from the author upon request.
12. Respondents in the SSEE survey were permitted to record incomes either as annual or as monthly. The variable used in this analysis includes monthly incomes with imputed missing and implausible values (implausible because they are values that could not realistically occur in Bulgaria given the other characteristics of the respondent, and hence almost certainly constitute errors in reporting or recording). The imputation was made by assigning expected values from a regression of each income variable being imputed on a set of characteristics known to determine incomes and little distortion was introduced. Cases that could not be imputed because data were missing for the independent variables in the regression equations were assigned a value of 0 and dropped from the analysis.
13. Blau and Kahn refer to these factors as "gender-specific." The more general term "group-specific" will be used here instead.

14. Note that a negative number indicates that the factor serves to decrease the gender earnings gap, describing a relative improvement of the standing of women. A positive number indicates that the factor serves to increase the gender earnings gap, contributing to a relative decline in standing for women.
15. Metaphor from Blau and Kahn [1999].

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